Accurate
TECHNOLOGY INC.
Linear Digital Measuring Systems

ProScale®
Model 18W

Limited Edition

Model 18W

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SAFETY WARNING

Before installing ProScale on any machinery:
Turn off machine and disconnect power.

SAFETY WARNING

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SECTION 1 GENERAL INFORMATION

Introduction

ProScale is a general purpose linear measuring system consisting of three major parts: a **SCALE**, an **ENCODER** and a **DIGITAL READOUT.**

ProScale is an ideal choice for most measuring requirements up to 8 inches where affordable digital precision (better than a tape measure) is desired. Because ProScale shows the exact measurement on its readout, it eliminates the ambiguity and mistakes involved when reading and interpreting tape measures, scales & pointer, or shaft encoders. And, because ProScale is a solid-state electronic device there's very little to wear out. The encoder and scale are designed to withstand shop dirt, dust, and other airborne contaminants. With normal care, ProScale will last for years.

About This Manual

This manual includes Installation and Operation information for the ProScale Model 18W

Specifications

Measuring Range*:	up to 8 inches
Accuracy:	± .003 inches
Readout Resolution	.1inch .1mm or .01inch .01mm or .001inch .01mm or 1/16, 1/32 or 1/64 inch
Repeatability:	.001inch or .01mm
Readout Range:	+ 999.999 in; + 399 63/64 in; + 9999.99 mm
Operating Power: Digi Readout	 2 AA Alkaline Batteries
Operating Temp:	40 to 110°F
Slew Rate:	60 inches/second
Encoder cable:	120 inch

*** PHYSICAL length of the aluminum scale extrusion is approximately 4 inches *longer* than the MEASUREMENT range.**

About ProScale Model 18W

ProScale Model 18W is a Limited Edition 20th Anniversary Model sold exclusively on www.proscale.com and at Industry Trade shows where Accurate Technology exhibits.

ProScale Model 18W systems consist of a **SCALE,** an **ENCODER** and a **DIGITAL READOUT** (or DRO).

Scale

The scale consists of a series of conductive patterns bonded to an aluminum extrusion. The Model 18W Scale is .765 inches wide and comes in measuring lengths up to 8 inches long.
All Scales are approximately 4 inches longer in their physical length than their measuring range.

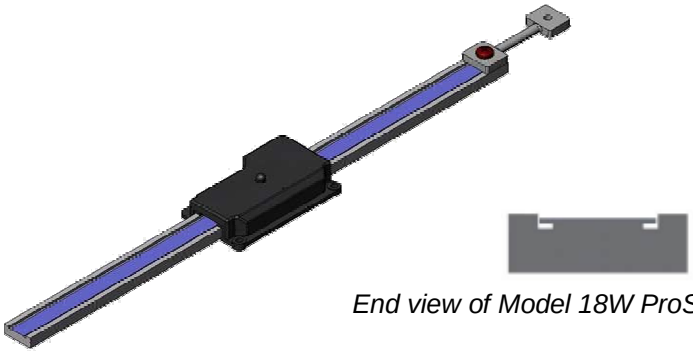
Encoder

The ProScale encoder contains electronic circuitry that transmits and receives signals to and from the scale using a patented technology called inductive coupling. This data is then sent to the digital readout where it can be displayed in millimeters, inches, or fractions.
Multiple encoders, each connected to a digital readout, may be used on the same scale simultaneously.

Model 18W encoders have blue housings with a 120 inch shielded cable exiting from one corner. The encoder orientation on the scale may be reversed to reverse the direction of the measurement readings, or they may be reversed through programming in the digital readout.

Digital Readout

ProScale Model 18W uses a special edition white ProScale Digital Readout. Refer to **SECTION 3** of this manual for information about programming, installation and operation of this readout.



End view of Model 18W ProScale

ProScale Model 18W

The Model 18W can be used in many different measurement applications, and with numerous types of equipment. Therefore all installations will be a little different and it is the responsibility of the user to choose the bolts, screws, or other mounting hardware that provides a quality installation and optimum operation in their application.
Determine an appropriate mounting location and position for ProScale in your measuring application. Most installations of the Model 18W will hold the encoder stationary and allow the scale to pass through the encoder during measurement. If you choose this installation proceed to Step 1.
However, the ProScale will also operate correctly is the encoder is moved along the scale during measurements. If you choose this method, proceed directly to Step 2

Note: Never drill through the colored portion of the scale at any point over which the encoder will travel.

1. Stationary Encoder installation
   Attach one end of the Connector Link to the scale using the included screw and fasten the other end of the connector link to the moving part of the measuring application or machine. Attach the encoder to a fixed point using three screws or bolts. Insure that the scale is properly aligned to pass through the encoder with the direction of motion of the moving part. Be sure connections are secure or inaccurate readings could result. Plug the encoder cable into the readout.

Connector Link

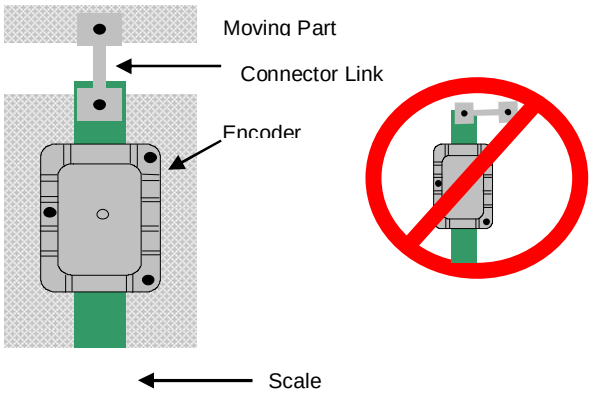
2. Stationary Scale installation

If your application is better suited for the scale to be held stationary and the encoder moved along it during a measurement, you should use the Guide Clip to *capture* the encoder and move it along the scale (see illustration).

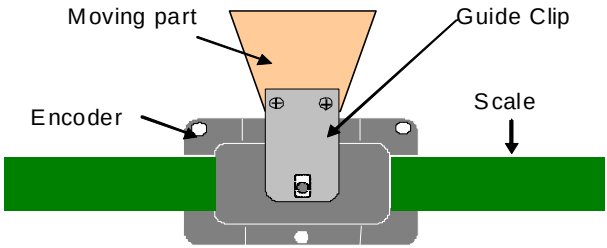
Guide Clip

Attach the scale to a fixed point in your application using the included screw. Place the encoder on the scale. Attach the guide clip to a moving point in your application such that the slot on the underside of the clip engages the post on the top of the encoder and captures it's movement along the scale. The guide clip should exert some pressure on the encoder over the full range of travel as the two move as a single unit.

Insure the scale and encoder are properly aligned as the encoder is moved (the guide clip will compensate for slight misalignment in the direction perpendicular to movement). Adjust the scale alignment if necessary. Plug the encoder cable into the readout.



Encoder stationary, Scale moving



Scale stationary, Encoder moving

SECTION 3 DIGITAL READOUT

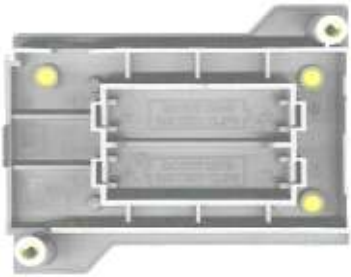
This Section includes information for:

Digital Readout, Model 18W Part Number: 700-1600-231
Firmware Version P 3xxxx & higher
(Firmware version is displayed on power-up)

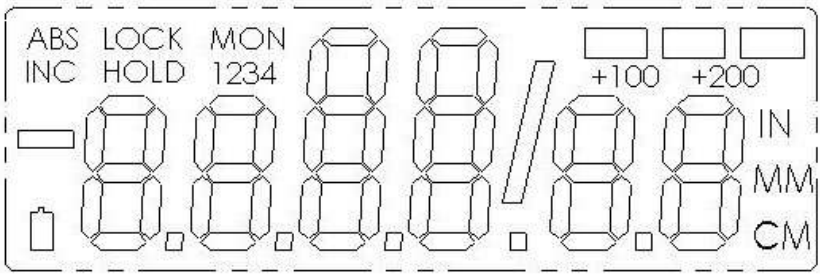
Mounting

The Readout may be mounted:

- Using Velcro or Double sided tape
- Drilling out the 3 holes from the inside of the case
- Using any of the six holes on the back of the case which may tapped for M2 or 4-40 screws.



The LCD



The above figure illustrates all the segments available on the LCD

Pressing and holding the ON/OFF and UNITS key for 10 seconds with power OFF will perform a full segment LCD test, display the current firmware version, AND RESET ALL PROGRAMMING PARAMETERS TO FACTORY DEFAULT VALUES.

NOTE: The DRO may also be defaulted to original factory settings by removing the battery and then pressing and holding the **UNITS** key while re-inserting battery. ***

*** Internal jumper JP3 must be set to the *Program Enable* position to allow the DRO to be reset to factory defaults as described above.**

Fundamental Operation

The following operations & functions apply to the Model 18W Digital Readout.

KEY TIMING

The keys pictured below have multiple functions. Timing (how long a key is depressed) is important. This manual uses the term "*momentarily*" to describe a key *press and release* of less than .8 seconds. Whereas *"press and hold*" is used to describe a key *press and release* of 1 second or longer. **See Table Below:**

	Momentarily	Press & Hold
How long a key is pressed?	Less than .8 seconds	More than 1 second
When is key function executed?	On key release	While holding

A function is executed on the "key release" for momentary key presses.
A function is executed after the allotted time has elapsed for "press & hold" operations. **See Table Below:**

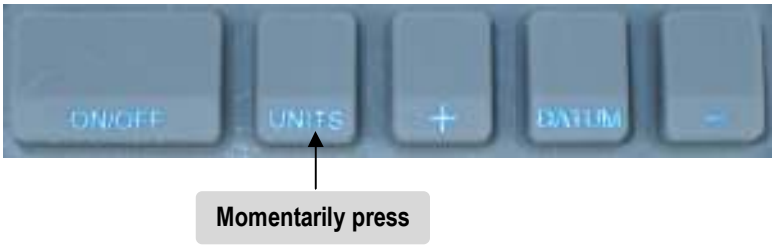
	Momentarily Press	Press & Hold
UNITS	Cycles measurement units: inches, fractions, mm	No effect
(in programming mode)	Increments program parameter list	Displays Pr #
Plus (+)	increments displayed value	increments faster
(in programming mode)	increments parameter value	increments faster
Datum	forces reading to programmed datum value	After 6 seconds: battery voltage After 9 seconds: Temperature
(in programming mode)	forces parameter to factory default	no effect
Minus (-)	decrements displayed value	decrements faster
(in programming mode)	decrements parameter value	decrements faster

Key Functions for standard operation

ON/OFF KEY

Momentarily press the **ON/OFF** key to turn DRO off then momentarily press it again to turn it back on. The Firmware version is displayed for two seconds at power-on.

UNITS KEY

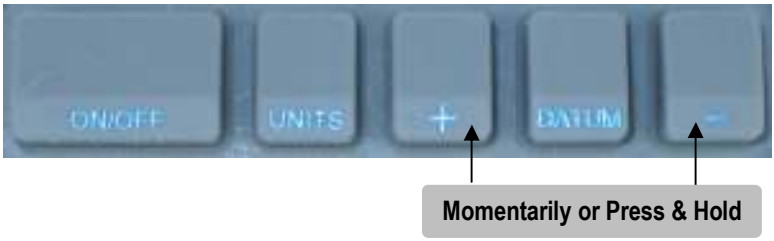


Momentarily depressing the **UNITS** key will display measurement/position information in inches, fractions or millimeters . With each key press, the DRO will cycle through decimal inches, fractions (16ths, 32nds, 64ths) and millimeters.

When the DRO is in 1/16 or 1/32 inch fraction mode, a series of "bars" in the upper right corner of the LCD, each representing 1/64th of an inch, may appear. (ie. When in 1/16 inch mode and three bars are showing, the measurement displayed is rounded *down* to the closest 1/16 inch and each illuminated bar indicates an additional 1/64 of an inch of additional measurement.) For better resolution, switch to 1/32 or 1/64 mode. For the best resolution switch to a decimal mode.

When the measurement is greater than 99 63/64 inches, a **+100** and/or **+200** will illuminate in the upper right portion of the display to indicate this amount must be added to the displayed reading. ie: If the measurement is 154 5/8 inches, 54 5/8 and **+100** will be illuminated on the display. If the measurement is -307 23/64 inches, - 7 23/64, **+100** and **+200** will be illuminated on the display.

PLUS (+) & MINUS (–) KEYS



Momentarily depressing the **+** or **–** key increments or decrements the current displayed value by one unit of measurement.
Pressing and holding the **+** or **–** key will cause the displayed value to change continuously. Continue pressing the key to cause the amount of change to speed up. This allows for quick adjustments over a large range of values. These keys may be locked out to prevent accidental offset entries.
See* LOCK FUNCTION *and Programming Parameter (Pr3).

DATUM KEY

The **DATUM** key is used to change the currently displayed value.
Momentarily pressing the **DATUM** key forces the display to a user programmed value. This can be zero or any other displayable value.
See Programming Parameter (Pr1).
The **DATUM** key can be locked out to prevent accidental entries.
See* LOCK FUNCTION *and Programming Parameter (Pr3).

Press and hold the **DATUM** key for 6 seconds to display the battery voltage.

Basic Functions

MEASUREMENT READING DIRECTION

Once the system has been put into operation, if the direction of readings, (positive or negative values) is opposite the desired direction, the DRO programming may be changed to correct the direction.
See Programming Parameter (Pr2).

KEY LOCK

The Digital Readout provides a function that can be used to "lock-out" the position offset adjustment keys (**+**, **DATUM**, **–**) to prevent accidental changes of the current displayed value. To activate the Lock function, press and hold the **ON/OFF** key and then momentarily press the **UNITS** key. The word **LOCK** will be displayed in the upper left corner of the LCD. When the **LOCK** symbol is displayed, the **+**, **DATUM** and **–** keys become inactive.

To de-activate the Lock function, press and hold the **ON/OFF** key and then momentarily press the **UNITS** key.
The Lock function can also be enabled through programming. This allows a more permanent Lock function since programming can be disabled with a hardware jumper inside the DRO. ***See Programming Parameter (Pr3)***

DISPLAY RESOLUTION

Four display resolutions are available with the Model 18W Readout.

.1in	.1mm	or
.01in	.01mm	or
.001in	.01mm	or

To change to another display resolution ***See Programming Parameter (Pr4)***
Allowable ranges are:

Inch Resolution	Maximum Value (Inches)
3 decimal places	999.999
2 decimal places	9999.99
1 decimal place	99999.9

Millimeter Resolution	Maximum Value (mm)
2 decimal places	9999.99
1 decimal place	99999.9

Changing the Batteries

A low battery indicator will appear in the lower left corner of the LCD.
Press and hold **DATUM** key for 6 seconds to display the Battery Voltage.
When battery voltage drops below approximately 2.6V the DRO will turn itself off until the batteries are replaced.

To replace the battery:

Remove the screws in the upper right and lower left corners. Pull the cover off. Remove the old batteries. Reinstall 2 new AA Alkaline batteries, noting the proper orientation. Replace the cover and tighten the screws.

CAUTION: DO NOT BEND BATTERY CLIPS!
THESE CLIPS ARE DESIGNED TO BE LOOSE WHEN THE CASE IS OPEN AND WILL COMPRESS AND SECURE THE BATTERIES IN PLACE WHEN THE CASE HALVES ARE SCREWED TOGETHER.

Circuit Board Jumpers

JP1 **FACTORY USE ONLY**

JP2 **FACTORY CONFIGURED: DO NOT CHANGE**

JP3 **Programming Lock-out** **Default = Position A**

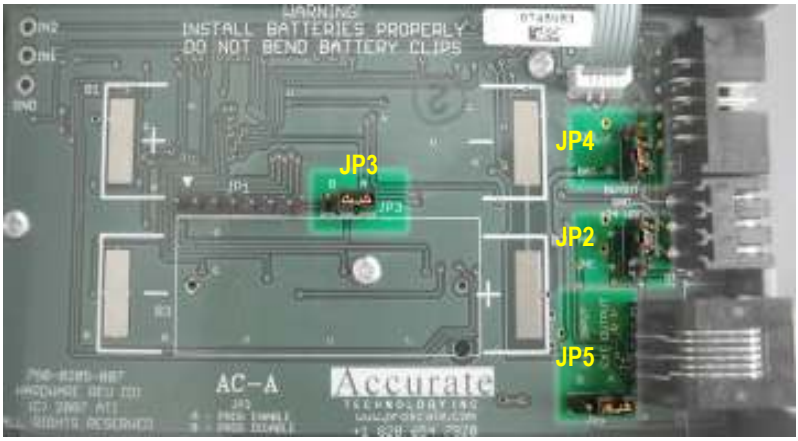
Front panel programming of the Digital Readout can be enabled or disabled though the use of this circuit board jumper.

Front panel Programming is enabled when the shorting jumper is installed in position **A**. To disable Programming, install jumper on position B.

When programming is disabled, user cannot access the programming functions via the front panel as described in: PROGRAMMING PARAMETERS. This provides a method of configuring the Digital Readout with specific parameters then preventing unauthorized or accidental configuration changes.

JP4 **FACTORY CONFIGURED: DO NOT CHANGE**

JP5 **FACTORY CONFIGURED: DO NOT CHANGE**



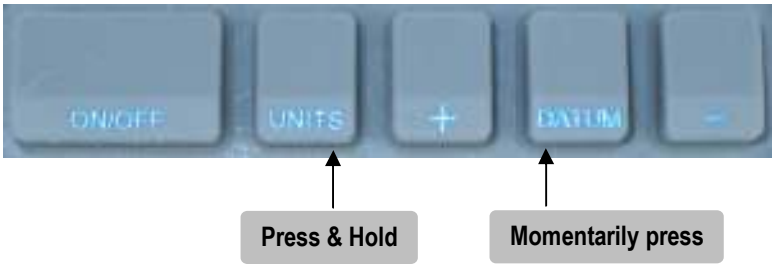
DRO Circuit Board

SECTION 4 PROGRAMMING

Several functions of the Readouts are user programmable. The following section describes how to change factory defaults to customize your DRO.

To enter Programming Mode:

1. Press and hold the **UNITS** key then momentarily press the **DATUM** key.
2. The LCD will briefly display: **PG on** (Programming On), then **Pr 1**, (indicating Programming Parameter #1)
3. Release the **UNITS** key
4. The value stored for ***Pr1*** is displayed.



Once in the Programming Mode:

Moving up parameter list - Momentarily press the **UNITS** key to advance through the Programming Parameter list, first displaying the Programming Parameter number then the currently programmed value.

Moving down parameter list - Press and hold the **ON/OFF** key and momentarily press the **UNITS** key to move backward through the Programming Parameter list.

Increase parameter value - Momentarily press the **PLUS (+)** key while displaying a Programming Parameter Value to increase the parameter setting.

Decrease parameter value - Momentarily press the **MINUS (-)** key while displaying a Programming Parameter Value to decrease the parameter setting.

Reset parameter value to default setting - Momentarily press the **DATUM** key while displaying a Programming Parameter Value to reset the parameter to the factory default value.

Exit programming mode - Press and hold the **UNITS** key. Momentarily depress the **DATUM** key. The LCD will briefly display: **PG oFF** (Programming Off), then return to normal operation. **NOTE**: The system will automatically exit programming mode after 60 seconds of no key activity.

The Digital Readout Programming Parameters are listed below.
Values in **[ ]** are the range of values available for that Parameter.
Factory defaults values are shown in **Bold Red.**

Pr 1 – Datum Key

[0 to ± 999.999in**]** or **[0** to ±9999.99mm**]**

The programmed value that will be recalled whenever the Datum key is pressed during normal operation.
Default = 0.00

Pr 2 – Direction of Travel

[0 or 1**]**

This parameter controls the sign of travel (positive vs. negative) when the measuring system is moved.
Default = 0

Pr 3 – Key Lockout

[0 or 1**]**

This parameter controls the operation of the **+**, **-** and **DATUM** keys. If enabled, (set to 1), these keys will not function and the **LOCK** symbol will appear on the display. This prevents accidental changes when depressing these keys during normal operation.
Default = 0

Pr 4 – Display Resolution

[1, 2, **3]**

This parameter sets the number of places to the right of the decimal point on the display. When the DRO is in a decimal mode (in, mm or cm), it will auto-range to the next resolution if the value is too large to be displayed in the current resolution but is displayable in an alternate resolution.
A value of **1** will display x.x.
A value of **2** will display x.xx
A value of **3** will display x.xxx
Default = 3

- This programming option has no effect when displaying fractions.

Pr 5 – Movement for Auto-On function

[0.3 to 10mm**]**

This parameter sets the amount of encoder, or system, movement required to automatically wake up the digital readout when it is turned off.
Default = 0.1mm

Frequently Asked Questions

Can I mount the Scale/Encoder without the connector link/guide clip?

Yes. However, the connector link and guide clip serve to provide an accurate method of transferring the movement of the encoder or scale, while also absorbing any stresses that may occur. If they are not used, your system could be damaged and **the warranty could be voided.**

What does* `no Enc` *mean?

If the encoder is off the scale, or unplugged from the readout, a `no Enc` will appear on the readout. To clear the error:

1. Be sure the encoder is on the scale.
2. Plug the encoder into the readout.
3. Unplug the encoder from the readout for one second then reconnect it.

What does* `b FAIL` *mean?

When the readout displays this message it means the battery voltage has dropped to a level where reliable operation is no longer possible. Install new batteries to clear this message.

What does* `P FAIL` *mean?

When the readout displays this message it means the battery voltage has dropped to a level where reliable programming is not possible. Install new batteries to clear this message.

How do I calibrate my ProScale?

There is no calibration available or necessary for the ProScale. System accuracy will depend on the accuracy of the ProScale Scale itself and the quality of the installation.

Thank you for choosing an
AMERICAN MADE PRODUCT

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Please register your product at:
http://www.proscale.com/registration.htm

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